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JC13

FIG. 1A

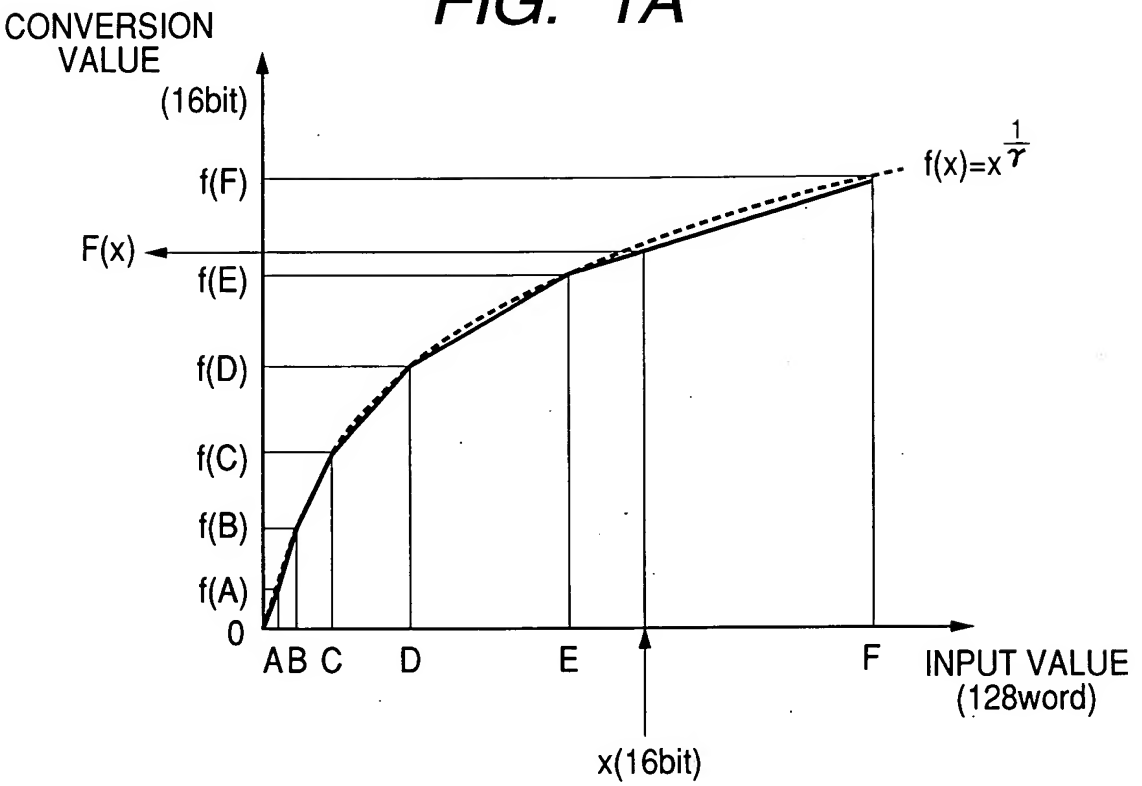


FIG. 1B

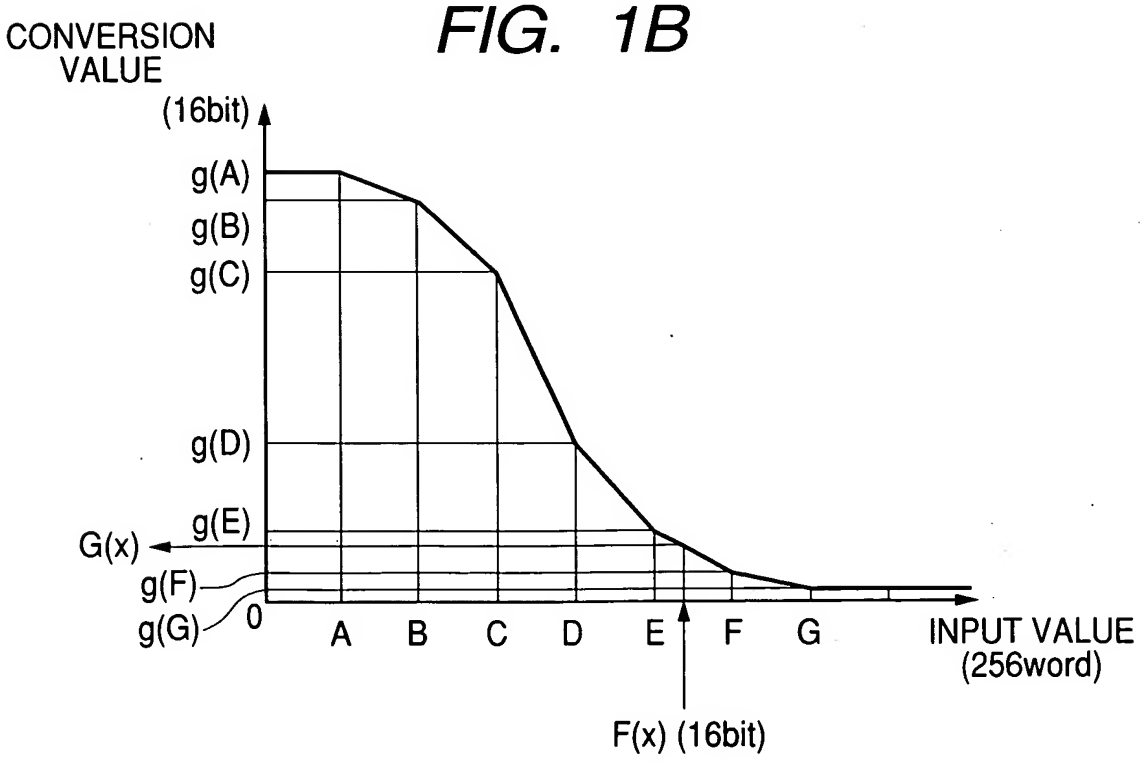


FIG. 2A

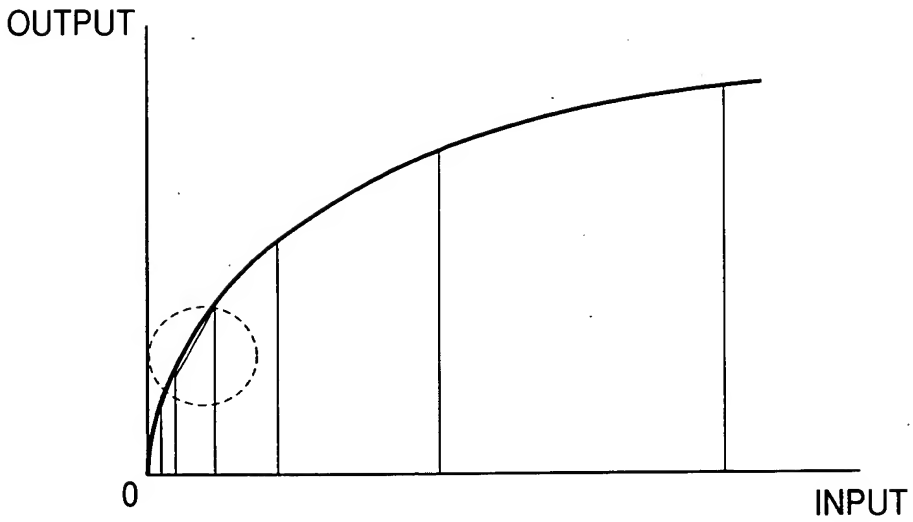


FIG. 2B

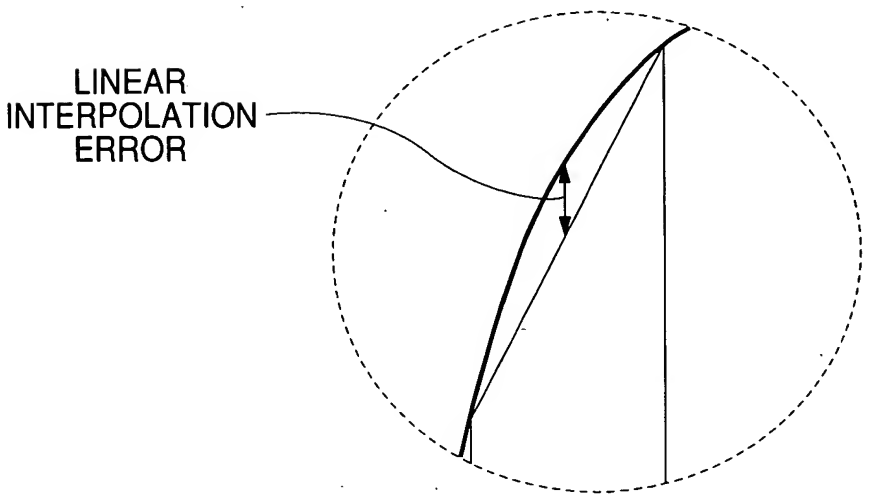


FIG. 3

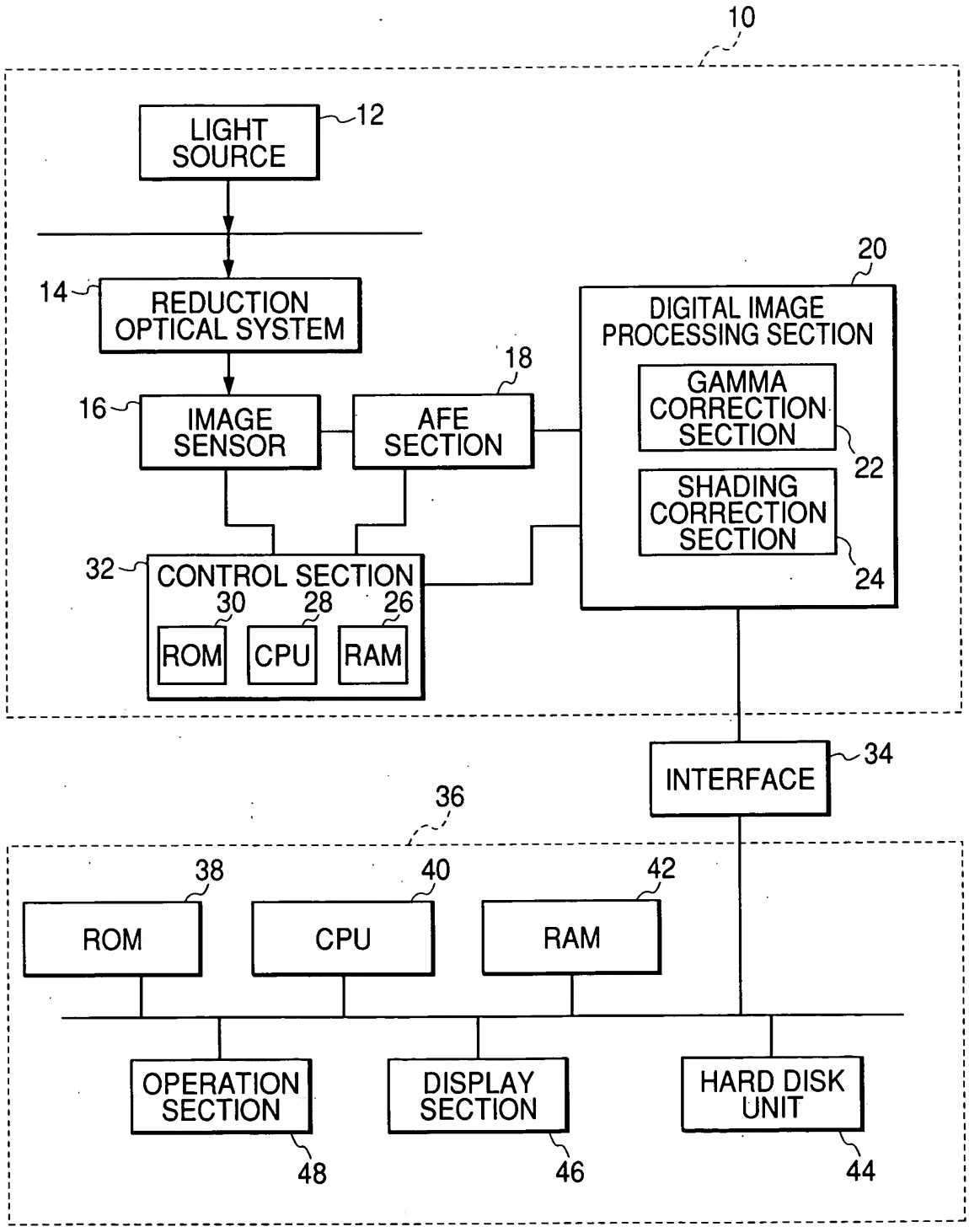

10
LIGHT SOURCE
12
14
REDUCTION OPTICAL SYSTEM
16
IMAGE SENSOR
18
AFE SECTION
20
DIGITAL IMAGE PROCESSING SECTION
GAMMA CORRECTION SECTION
22
SHADING CORRECTION SECTION
24
32
CONTROL SECTION
30
28
26
ROM
CPU
RAM
INTERFACE
34
36
38
40
42
ROM
CPU
RAM
OPERATION SECTION
48
DISPLAY SECTION
46
HARD DISK UNIT
44

FIG. 4

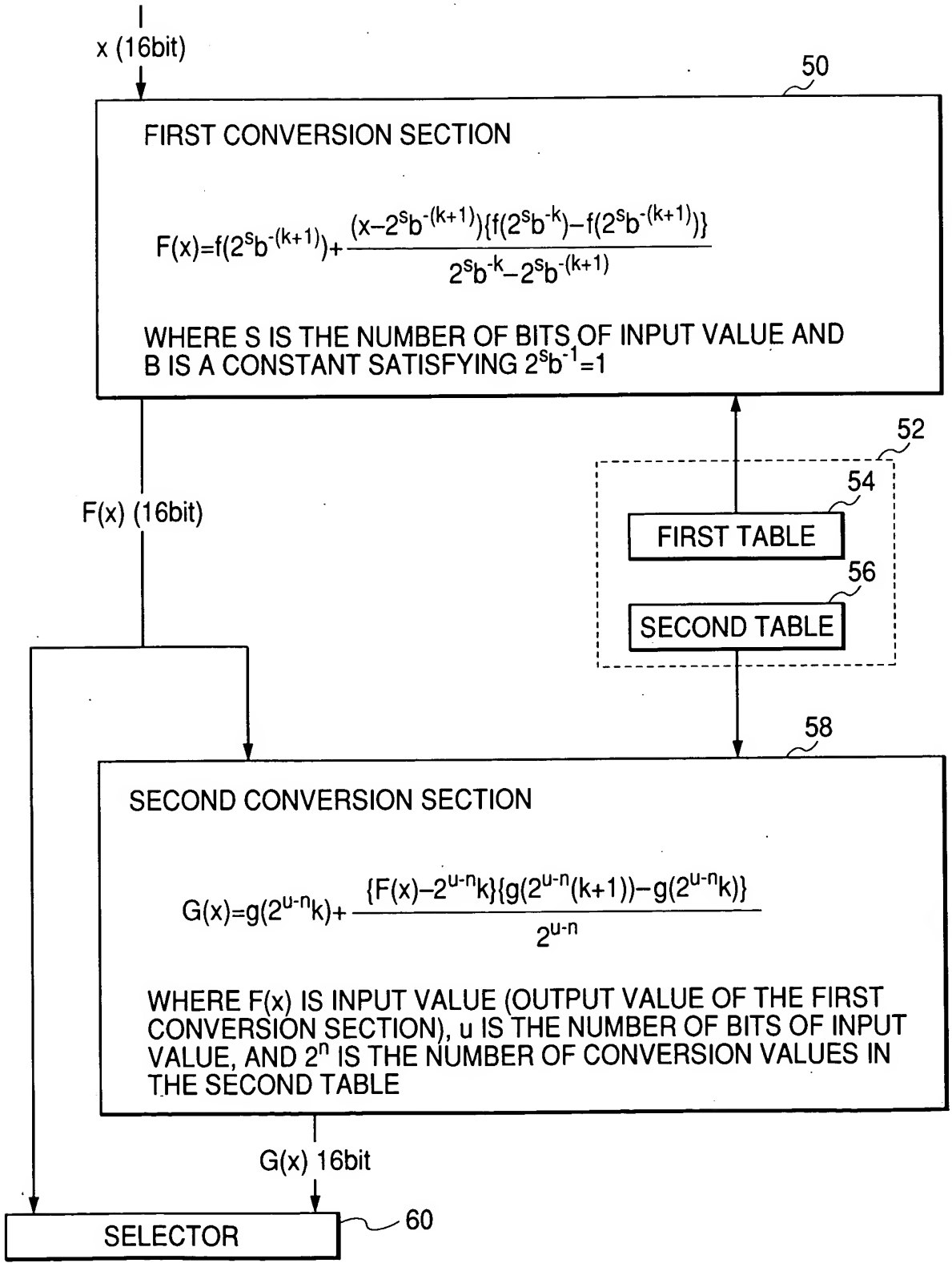

x (16bit)
50
FIRST CONVERSION SECTION
$F(x)=f(2^{s}b^{-(k+1)})+\frac{(x-2^{s}b^{-(k+1)})\{f(2^{s}b^{-k})-f(2^{s}b^{-(k+1)})\}}{2^{s}b^{-k}-2^{s}b^{-(k+1)}}$
WHERE S IS THE NUMBER OF BITS OF INPUT VALUE AND B IS A CONSTANT SATISFYING $2^{s}b^{-1}=1$
52
54
FIRST TABLE
56
SECOND TABLE
F(x) (16bit)
58
SECOND CONVERSION SECTION
$G(x)=g(2^{u-n}k)+\frac{\{F(x)-2^{u-n}k\}\{g(2^{u-n}(k+1))-g(2^{u-n}k)\}}{2^{u-n}}$
WHERE F(x) IS INPUT VALUE (OUTPUT VALUE OF THE FIRST CONVERSION SECTION), u IS THE NUMBER OF BITS OF INPUT VALUE, AND 2^{n} IS THE NUMBER OF CONVERSION VALUES IN THE SECOND TABLE
G(x) 16bit
SELECTOR
60

FIG. 5

	INPUT VALUE																ADDRESS
	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	
	1	1	1	1	1												1100_1111
LOW-ORDER 11-BIT INTERPOLATION	1	1	1	1	0												1100_1110
	1	0	0	0	1												1100_0001
	1	0	0	0	0												1100_0000
LOW-ORDER 10-BIT INTERPOLATION	0	1	1	1	1	1											1011_1111
	0	1	0	0	0	0											1011_0000
LOW-ORDER 9-BIT INTERPOLATION	0	0	1	1	1	1	1										1010_1111
	0	0	1	0	0	0	0										1010_0000
LOW-ORDER 8-BIT INTERPOLATION	0	0	0	1	1	1	1	1									1001_1111
	0	0	0	1	0	0	0	0									1001_0000
LOW-ORDER 7-BIT INTERPOLATION	0	0	0	0	1	1	1	1	1								1000_1111
	0	0	0	0	1	0	0	0	0								1000_0000
LOW-ORDER 6-BIT INTERPOLATION	0	0	0	0	0	1	1	1	1	1							0111_1111
	0	0	0	0	0	1	0	0	0	0							0111_0000
LOW-ORDER 5-BIT INTERPOLATION	0	0	0	0	0	0	1	1	1	1	1						0110_1111
	0	0	0	0	0	0	1	0	0	0	0						0110_0000
LOW-ORDER 4-BIT INTERPOLATION	0	0	0	0	0	0	0	1	1	1	1	1					0101_1111
	0	0	0	0	0	0	0	1	0	0	0	0					0101_0000
LOW-ORDER 3-BIT INTERPOLATION	0	0	0	0	0	0	0	0	1	1	1	1	1				0100_1111
	0	0	0	0	0	0	0	0	1	0	0	0	0				0100_0000
LOW-ORDER 2-BIT INTERPOLATION	0	0	0	0	0	0	0	0	0	1	1	1	1	1			0011_1111
	0	0	0	0	0	0	0	0	0	1	0	0	0	0			0011_0000
LOW-ORDER 1-BIT INTERPOLATION	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1		0010_1111
	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0		0010_0000
	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	0001_1111
NO INTERPOLATION	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0000_0001
	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0000_0000

FIG. 6

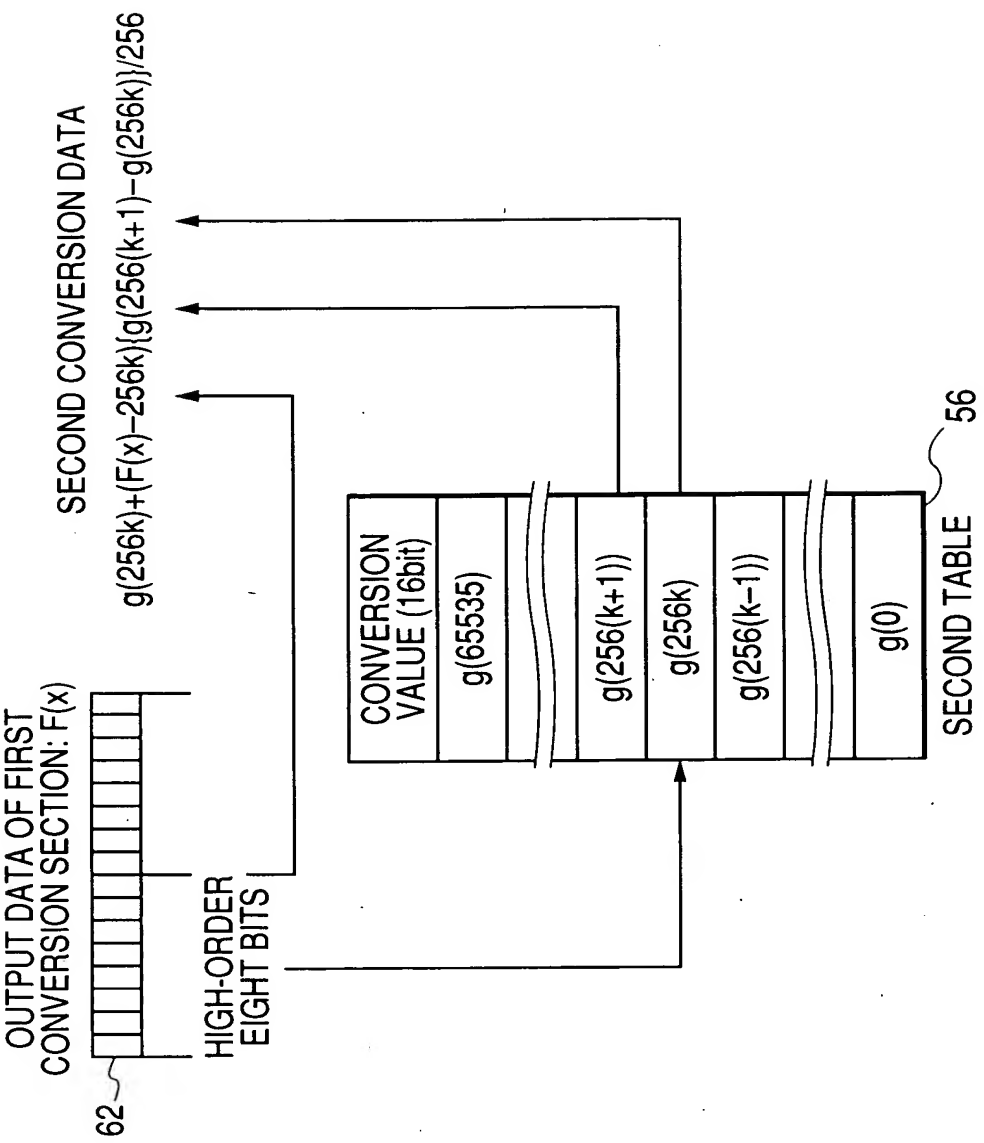
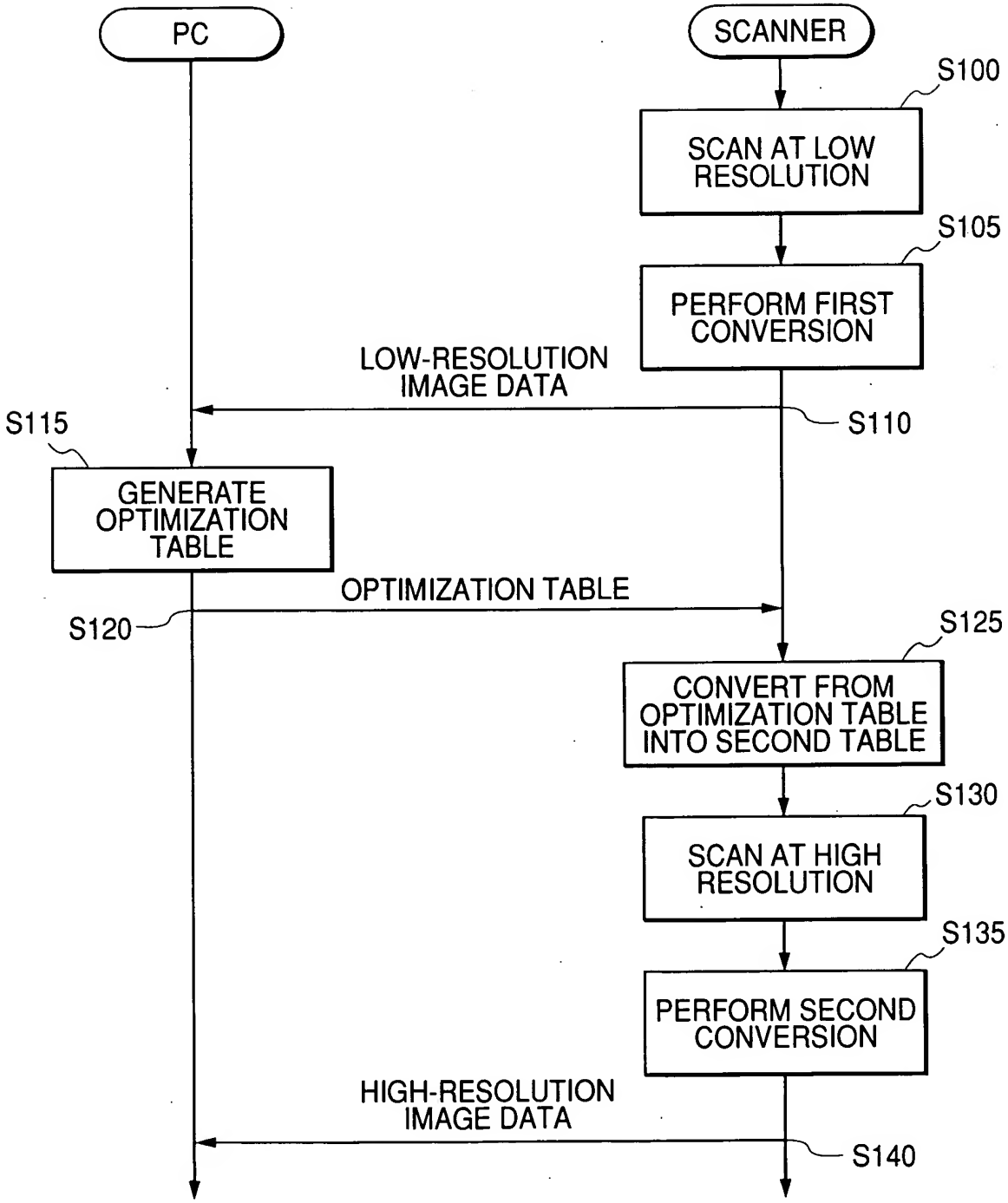

OUTPUT DATA OF FIRST CONVERSION SECTION: F(x)
62
HIGH-ORDER EIGHT BITS
SECOND CONVERSION DATA
g(256k)+(F(x)−256k){g(256(k+1)−g(256k)}/256
CONVERSION VALUE (16bit)
g(65535)
g(256(k+1))
g(256k)
g(256(k−1))
g(0)
SECOND TABLE
56

FIG. 7


PC
SCANNER
S100
SCAN AT LOW RESOLUTION
S105
PERFORM FIRST CONVERSION
LOW-RESOLUTION IMAGE DATA
S110
S115
GENERATE OPTIMIZATION TABLE
OPTIMIZATION TABLE
S120
S125
CONVERT FROM OPTIMIZATION TABLE INTO SECOND TABLE
S130
SCAN AT HIGH RESOLUTION
S135
PERFORM SECOND CONVERSION
HIGH-RESOLUTION IMAGE DATA
S140

BEST AVAILABLE COPY

FIG. 8

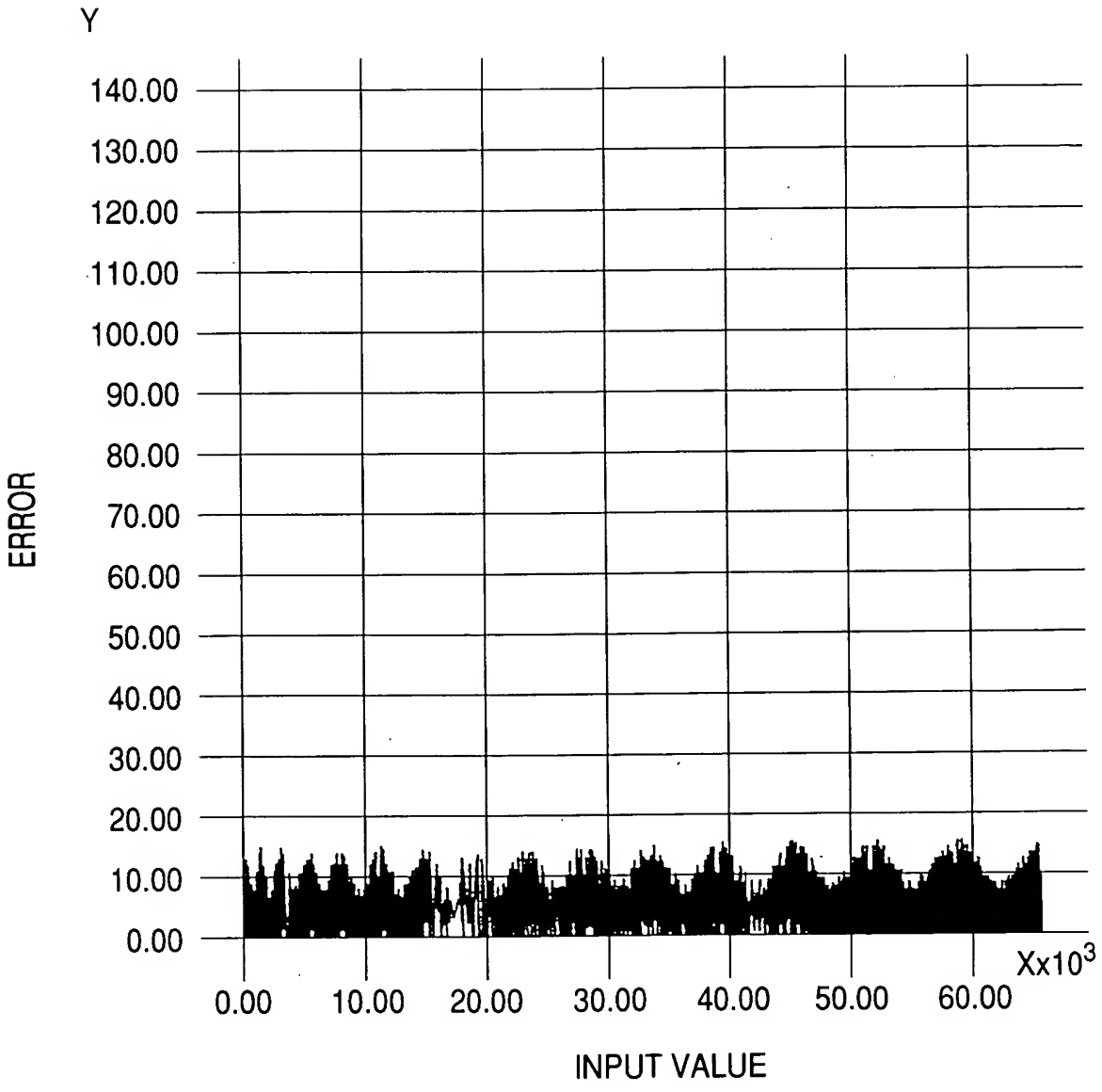


FIG. 9

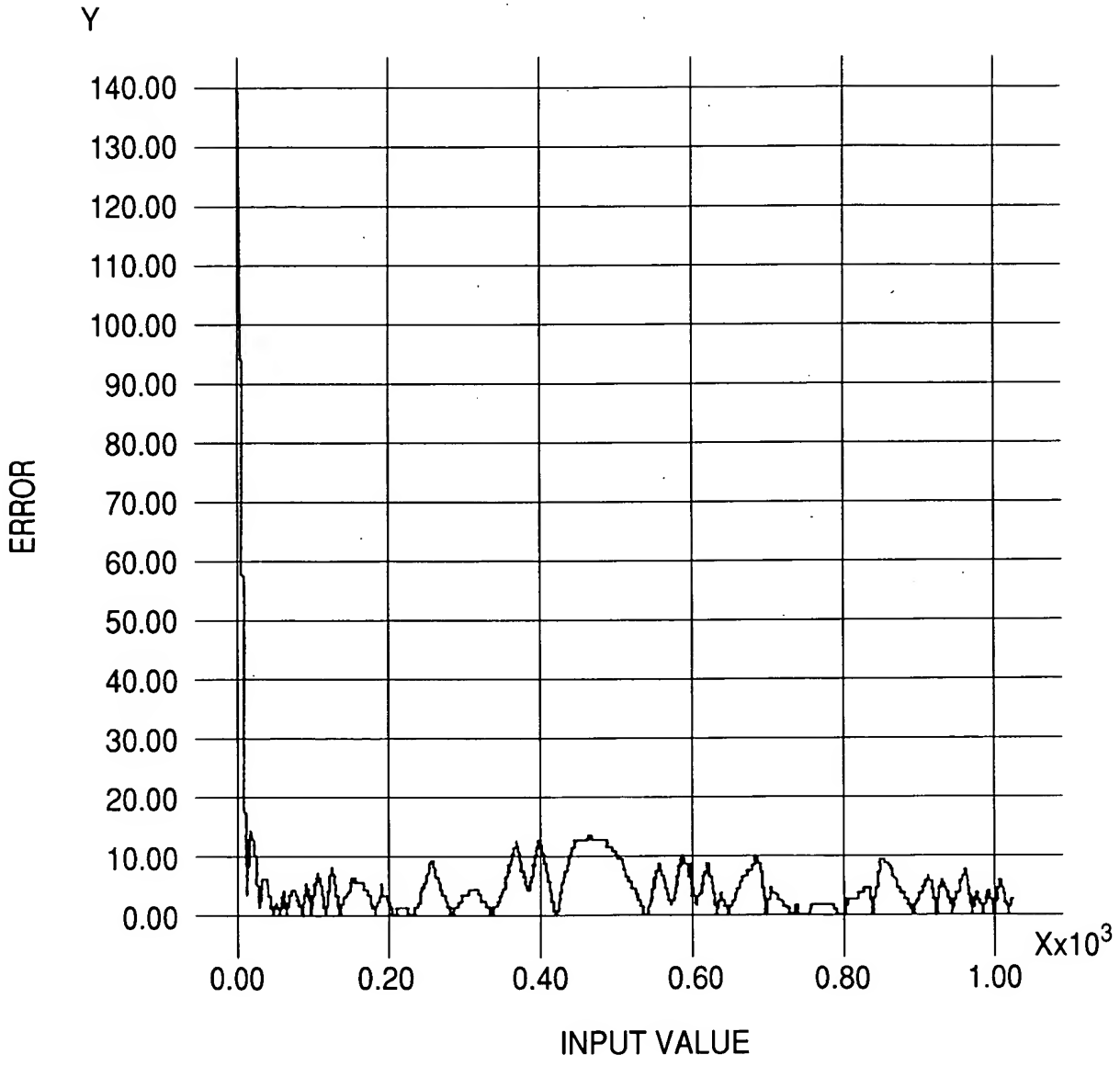
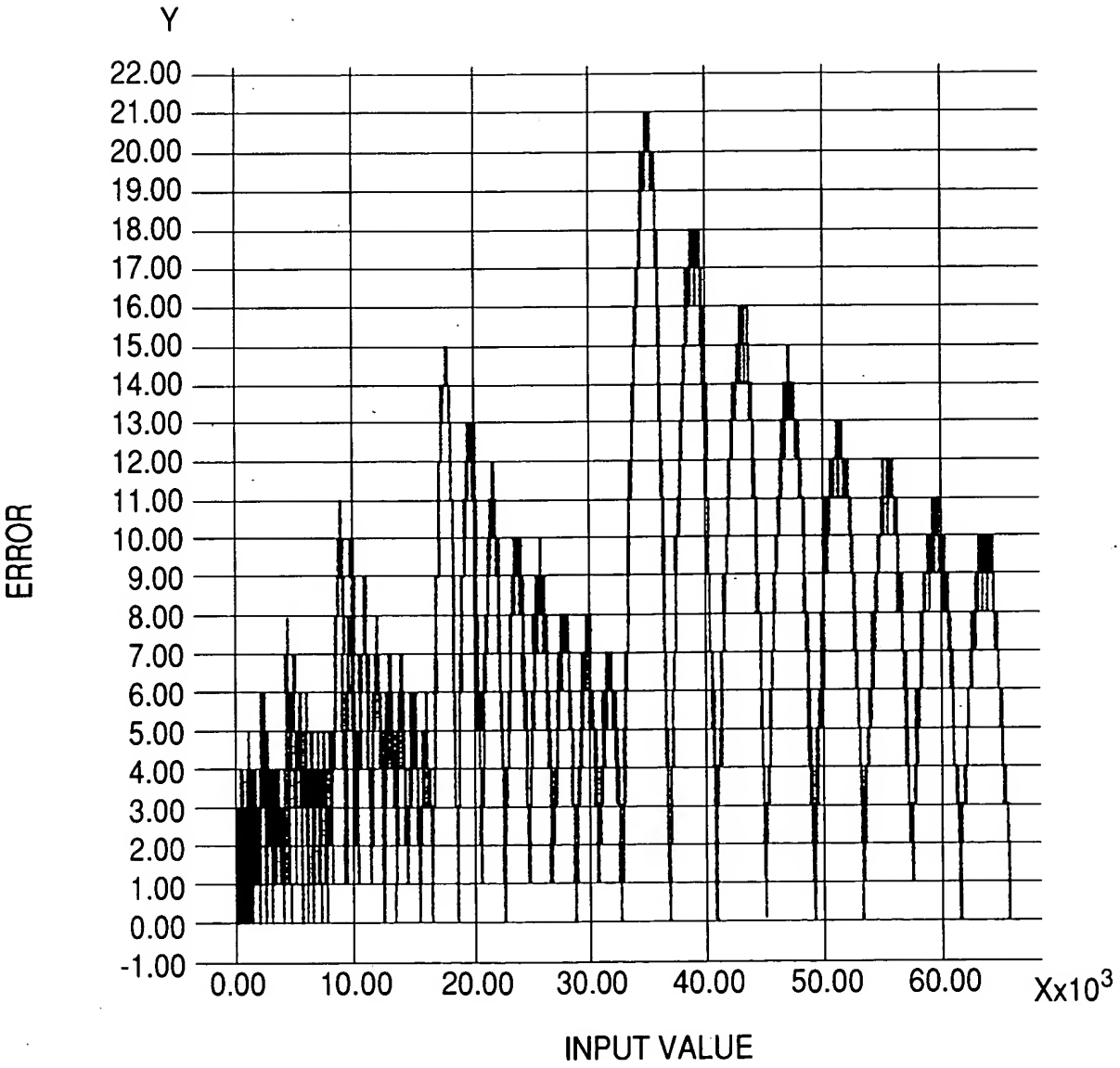

Y
140.00
130.00
120.00
110.00
100.00
90.00
80.00
70.00
60.00
50.00
40.00
30.00
20.00
10.00
0.00
ERROR
0.00
0.20
0.40
0.60
0.80
1.00
Xx10^3
INPUT VALUE

FIG. 10


Y
22.00
21.00
20.00
19.00
18.00
17.00
16.00
15.00
14.00
13.00
12.00
11.00
10.00
9.00
8.00
7.00
6.00
5.00
4.00
3.00
2.00
1.00
0.00
-1.00
ERROR
0.00
10.00
20.00
30.00
40.00
50.00
60.00
Xx10^3
INPUT VALUE

BEST AVAILABLE COPY

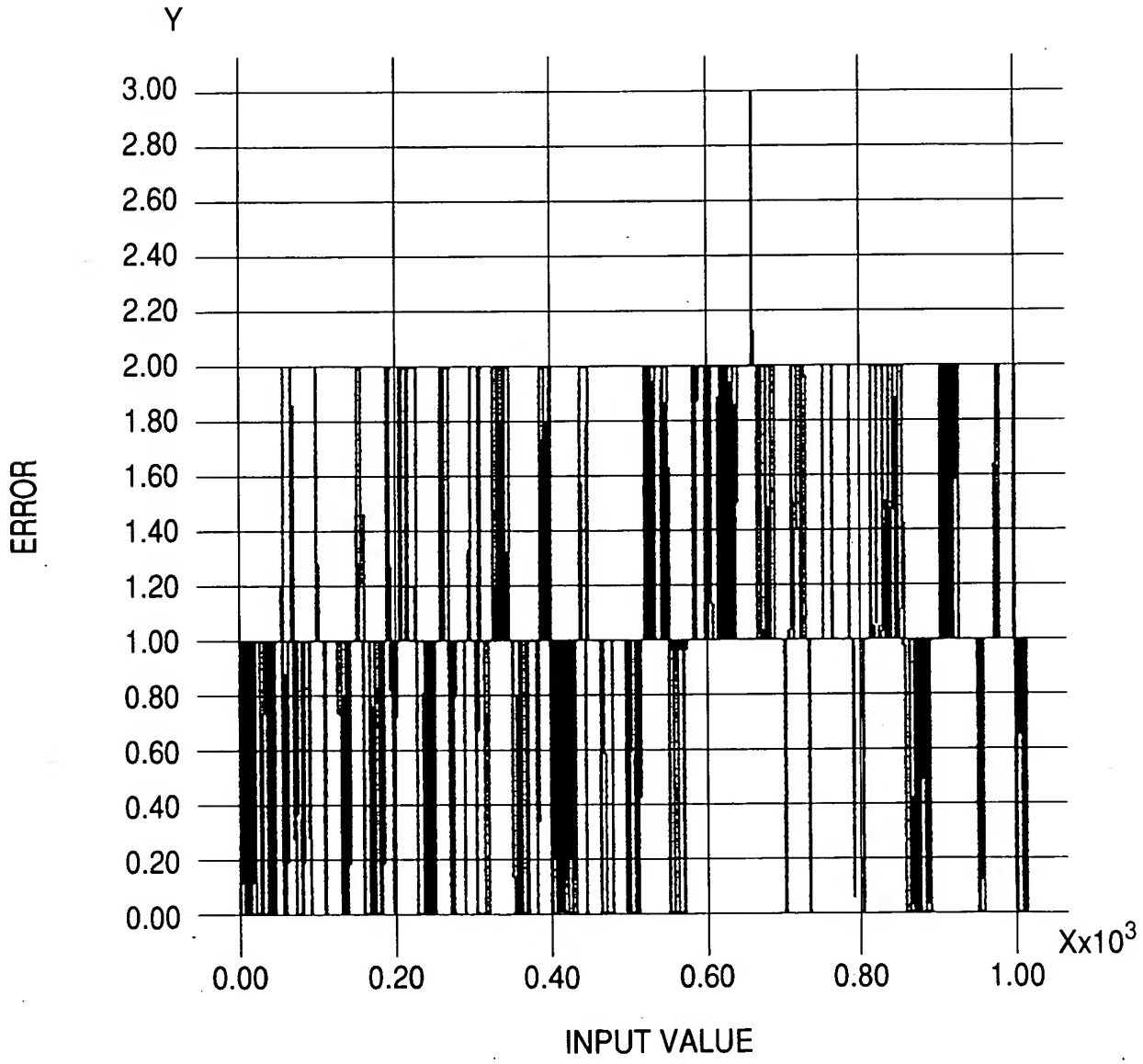



FIG. 11